

MTS-3324US

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	K. Uriu et al.	: Art Unit:
Serial No.:	To Be Assigned	: Examiner:
Filed:	Herewith	:
FOR:	LAMINATED BANDPASS FILTER, HIGH FREQUENCY RADIO DEVICE AND LAMINATED BANDPASS FILTER MANUFACTURING METHOD	:

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents  
Washington, D.C. 20231  
S I R :

Prior to examination, please amend the above application as follows:

IN THE SPECIFICATION:

After the title and before the first paragraph, please insert the following paragraph:

THIS APPLICATION IS A U.S. NATIONAL PHASE  
APPLICATION OF PCT INTERNATIONAL APPLICATION  
PCT/JP01/05201.

Specification at page 5, line 1:

One aspect of the present invention is a laminated bandpass filter comprising:

Specification at page 5, line 24:

Another aspect of the present invention is the laminated bandpass filter, wherein said first and second strip lines have the same length and width.

Specification at page 6, line 3:

Still another aspect of the present invention is the laminated bandpass filter, wherein said first and second strip lines are placed in parallel with each other.

Specification at page 6, line 8:

Yet still another aspect of the present invention is the laminated bandpass filter, wherein said first and second strip lines are electrically connected to said internal grounding electrode via a via hole.

Specification at page 6, line 14:

Still yet another aspect of the present invention is the laminated bandpass filter, wherein only said first and second strip lines are placed on said dielectric sheet.

Specification at page 6, line 19:

A further aspect of the present invention is a laminated bandpass filter comprising:

Specification at page 7, line 21:

A still further aspect of the present invention is the laminated bandpass filter, wherein said first and second strip lines have the same length, width and position within the plane.

Specification at page 8, line 1:

A yet further aspect of the present invention is the laminated

A yet additional aspect of the present invention is the laminated bandpass filter, wherein all electrode patterns constituting the capacitor electrode connected to said input electrode and the capacitor electrode

connected to said output electrode as an input/output capacitance are provided on a layer superior to the layer constituting said strip lines.

Specification at page 10, line 1:

A still yet additional aspect of the present invention is the laminated bandpass filter, wherein with respect to said grounding electrode, an electrode pattern of at least one of said first and second capacitor electrodes is laminated, an electrode pattern of at least one of said first and second strip lines is laminated on a layer superior thereto, and an electrode pattern of at least one of said third to sixth capacitor electrodes is laminated on a layer superior to said layer.

Specification at page 10, line 10:

A supplementary aspect of the present invention is the laminated bandpass filter, wherein said third to sixth capacitor electrodes are provided on a layer superior to the layer constituting said strip lines.

Specification at page 10, line 15:

A still supplementary aspect of the present invention is a laminated bandpass filter comprising:

Specification at page 11, line 21:

A yet supplementary aspect of the present invention is the laminated bandpass filter, wherein said first to fourth strip lines have the same length and width, said first and third strip lines have the same position within the plane and said second and fourth strip lines have the same position within the plane.

Still yet another aspect of the present invention is the laminated bandpass filter, wherein said dielectric sheet is made up of a crystal phase and a glass phase, said crystal phase includes at least one of  $\text{Al}_2\text{O}_3$ ,  $\text{MgO}$ ,  $\text{SiO}_3$  and  $\text{RO}_a$  where R is at least one element selected from La, Ce, Pr, Nd, Sm and Gd

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and a is a numerical value determined stoichiometrically according to the valence of said R.

Specification at page 13, line 21:

A further aspect of the present invention is a laminated bandpass filter, said laminated body incorporating the bandpass filter and the bandpass filter.

Specification at page 14, line 3:

A still further aspect of the present invention is a composite high frequency device, wherein said laminated body incorporates the bandpass filter and another high frequency circuit.

Specification at page 14, line 8:

A yet further aspect of the present invention is a composite high frequency device, wherein electronic parts are mounted on said laminated body incorporating the bandpass filter.

Specification at page 14, line 13:

A still yet further aspect of the present invention is a high frequency device, characterized by comprising the laminated bandpass filter.

Specification at page 14, line 17:

An additional aspect of the present invention is a laminated bandpass filter manufacturing method comprising the steps of:

Specification at page 15, line 16:



A still additional aspect of the present invention is a laminated bandpass filter manufacturing method comprising the steps of:

Specification at page 16, line 20:

A yet additional aspect of the present invention is a laminated bandpass filter manufacturing method comprising the steps of:

Specification at page 29, line 19:

Furthermore, the dielectric layer 505 has strip lines 520 and 521, and the dielectric layer 506 has strip lines 522 and 523. The dielectric layer 507 has capacitor electrodes 524 and 525 and the dielectric layer 508 has an internal grounding electrode 526 and connected to the grounding electrode 510.

Specification at page 34, line 21:

The capacitor electrode 916 is connected to one end 915a of the strip line 915 and the capacitor electrode 912 via a via hole 920 and the capacitor electrode 917 is connected to one end 914a of the strip line 914 and the capacitor electrode 913 via a via hole 921.

IN THE CLAIMS:

4. (Amended) The laminated bandpass filter according to claims 1 or 2, wherein said first and second strip lines are electrically connected to said internal grounding electrode via a via hole.
5. (Amended) The laminated bandpass filter according to

claims 1 or 2, wherein only said first and second strip lines are placed on said dielectric sheet.

9. (Amended) The laminated bandpass filter according to any one of claims 1, 2, 6 or 7, further comprising:

a third capacitor electrode connected to said input electrode;

a fourth capacitor electrode connected to said output electrode;

a fifth capacitor electrode capacitatively coupled with said third capacitor electrode; and

a sixth capacitor electrode capacitatively coupled with said fourth capacitor electrode,

wherein capacitive coupling of an area where said third capacitor electrode and said sixth capacitor electrode overlap each other in the lamination direction forms a jump capacitance.

10. (Amended) The laminated bandpass filter according to any one of claims 1, 2, 6 or 7, wherein capacitive coupling of an area where said fourth capacitor electrode and said fifth capacitor electrode overlap each other in the lamination direction forms a jump capacitance.

11. (Twice Amended) The laminated bandpass filter according to any one of claims 1, 2, 6 or 7, wherein with respect to said internal grounding electrode, on a layer superior thereto, an electrode pattern of at least one of said first and second capacitor electrodes is laminated, an electrode pattern of at least one of said first and second strip lines is laminated on a layer superior thereto, and an electrode pattern of at least one of the



capacitor electrode connected to said input electrode and the capacitor electrode connected to said output electrode is laminated on a layer superior to said layer.

12. (Twice Amended) The laminated bandpass filter according to any one of claims 1, 2, 6 or 7, wherein all electrode patterns constituting the capacitor electrode connected to said input electrode, the capacitor electrode connected to said output electrode and an input/output capacitance are provided on a layer superior to the layer constituting said strip lines.

13. (Twice Amended) The laminated bandpass filter according to claim 9, wherein with respect to said internal grounding electrode, on a layer superior thereto, an electrode pattern of at least one of said first and second capacitor electrodes is laminated, an electrode pattern of at least one of said first and second strip lines is laminated on a layer superior thereto, and an electrode pattern of at least one of said third to sixth capacitor electrodes is laminated on a layer superior to said layer.

14. (Twice Amended) The laminated bandpass filter according to claim 9, wherein said all of third to sixth capacitor electrodes are provided on a layer superior to the layer constituting said strip lines.

18. (Amended) The laminated bandpass filter according to claims 15 or 16, wherein said first to fourth strip lines are connected to said internal grounding electrode via a via hole.

19. (Twice Amended) The laminated bandpass filter according to claims 15 or 16, further comprising:

a fifth capacitor electrode connected to said input electrode;

a sixth capacitor electrode connected to said output electrode;

a seventh capacitor electrode capacitatively coupled with said fifth capacitor electrode; and

an eighth capacitor electrode capacitatively coupled with said sixth capacitor electrode,

wherein capacitive coupling of an area where said fifth capacitor electrode and said eighth capacitor electrode overlap each other in the lamination direction forms a jump capacitance.

20. (Amended) The laminated bandpass filter according to claims 15 or 16, wherein capacitive coupling of an area where said sixth capacitor electrode and said seventh capacitor electrode overlap each other in the lamination direction forms a jump capacitance.

Claim 21 has been cancelled.

22. (Twice Amended) A composite high frequency device, wherein said laminated body incorporates the bandpass filter according to any one of claims 1, 2, 6, 7, 15 or 16 and another high frequency circuit.

23. (Twice Amended) A composite high frequency device, wherein electronic parts are mounted on said laminated body incorporating the bandpass filter according to any one of claims 1, 2, 6, 7, 15 or 16.

24. (Twice Amended) The laminated bandpass filter according to any one of claims 1, 2, 6, 7, 15 or 16, wherein said dielectric sheet

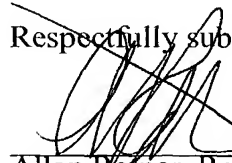
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is made up of a crystal phase and a glass phase, said crystal phase includes at least one of  $\text{Al}_2\text{O}_3$ ,  $\text{MgO}$ ,  $\text{SiO}_2$  and  $\text{RO}_a$  where R is at least one element selected from La, Ce, Pr, Nd, Sm and Gd and a is a numerical value determined stoichiometrically according to the valence of said R.

25. (Amended) A high frequency device, characterized by comprising the laminated bandpass filter according to any one of claims 1, 2, 6, 7, 15 or 16.

Respectfully submitted,



Allan Ratner, Reg. No. 19,717  
Attorney for Applicants

AR/dlm

Enclosure: Version With Markings Showing Changes Made

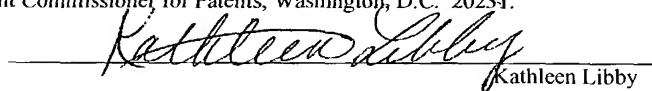
Dated: March 25, 2002

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Kathleen Libby

**VERSION WITH MARKINGS SHOWING CHANGES MADE**

IN THE SPECIFICATION:

After the title and before the first paragraph:

THIS APPLICATION IS A U.S. NATIONAL PHASE APPLICATION OF PCT INTERNATIONAL APPLICATION PCT/JP01/05201.

Specification at page 5, line 1:

~~The 1st invention~~ One aspect of the present invention ~~(corresponding to claim 1)~~ is a laminated bandpass filter comprising:

Specification at page 5, line 24:

~~The 2nd invention~~ Another aspect of the present invention ~~(corresponding to claim 2)~~ is the laminated bandpass filter ~~according to the 1st invention~~, wherein said first and second strip lines have the same length and width.

Specification at page 6, line 3:

~~The 3rd invention~~ Still another aspect of the present invention ~~(corresponding to claim 3)~~ is the laminated bandpass filter ~~according to the 1st or 2nd invention~~, wherein said first and second strip lines are placed in parallel with each other.

Specification at page 6, line 8:

~~The 4th invention~~ Yet still another aspect of the present invention ~~(corresponding to claim 4)~~ is the laminated bandpass filter ~~according to any~~

~~one of the 1st to 3rd inventions~~, wherein said first and second strip lines are electrically connected to said internal grounding electrode via a via hole.

Specification at page 6, line 14:

~~The 5th invention~~ Still yet another aspect of the present invention (corresponding to claim 5) is the laminated bandpass filter ~~according to any one of 1st to 4th inventions~~, wherein only said first and second strip lines are placed on said dielectric sheet.

Specification at page 6, line 19:

~~The 6th invention~~ A further aspect of the present invention (corresponding to claim 6) is a laminated bandpass filter comprising:

Specification at page 7, line 21:

~~The 7th invention~~ A still further aspect of the present invention (corresponding to claim 7) is the laminated bandpass filter ~~according to the 6th invention~~, wherein said first and second strip lines have the same length, width and position within the plane.

Specification at page 8, line 1:

~~The 8th invention~~ A yet further aspect of the present invention (corresponding to claim 8) is the laminated bandpass filter ~~according to the 6th or 7th invention~~, wherein said first and second strip lines are electrically connected to said internal grounding electrode via a via hole.

Specification at page 8, line 7:

~~The 9th invention~~ A still yet further aspect of the present

invention (~~corresponding to claim 9~~) is the laminated bandpass filter ~~according to any one of the 1st to 8th inventions~~, further comprising:

Specification at page 8, line 23:

~~The 10th invention~~ An additional aspect of the present invention (~~corresponding to claim 10~~) is the laminated bandpass filter ~~according to any one of the 1st to 9th invention~~, wherein capacitive coupling of an area where said fourth capacitor electrode and said fifth capacitor electrode overlap each other in the lamination direction forms a jump capacitance.

Specification at page 9, line 5:

~~The 11th invention~~ A still additional aspect of the present invention (~~corresponding to claim 11~~) is the laminated bandpass filter ~~according to any one of the 1st to 10th invention~~, wherein with respect to said grounding electrode, an electrode pattern of at least one of said first and second capacitor electrodes is laminated, an electrode pattern of at least one of said first and second strip lines is laminated on a layer superior thereto, and an electrode pattern of at least one of the capacitor electrode connected to said input electrode and the capacitor electrode connected to said output electrode is laminated on a layer superior to said layer.

Specification at page 9, line 17:

~~The 12th invention~~ A yet additional aspect of the present invention (~~corresponding to claim 12~~) is the laminated bandpass filter ~~according to any one of the 1st to 10th inventions~~, wherein all electrode patterns constituting the capacitor electrode connected to said input electrode and the capacitor electrode connected to said output electrode as an

input/output capacitance are provided on a layer superior to the layer constituting said strip lines.

Specification at page 10, line 1:

~~The 13th invention~~ A still yet additional aspect of the present invention is the laminated bandpass filter ~~according to the 9th invention~~, wherein with respect to said grounding electrode, an electrode pattern of at least one of said first and second capacitor electrodes is laminated, an electrode pattern of at least one of said first and second strip lines is laminated on a layer superior thereto, and an electrode pattern of at least one of said third to sixth capacitor electrodes is laminated on a layer superior to said layer.

Specification at page 10, line 10:

~~The 14th invention~~ A supplementary aspect of the present invention ~~(corresponding to claim 14)~~ is the laminated bandpass filter ~~according to the 9th invention~~, wherein said third to sixth capacitor electrodes are provided on a layer superior to the layer constituting said strip lines.

Specification at page 10, line 15:

~~The 15th invention~~ A still supplementary aspect of the present invention ~~(corresponding to claim 15)~~ is a laminated bandpass filter comprising:

Specification at page 11, line 21:

~~The 16th invention~~ A yet supplementary aspect of the present invention ~~(corresponding to claim 16)~~ is the laminated bandpass filter ~~according to the 15th invention~~, wherein said first to fourth strip lines have the

same length and width, said first and third strip lines have the same position within the plane and said second and fourth strip lines have the same position within the plane.

Specification at page 12, line 3:

~~The 17th invention~~ A still yet supplementary aspect of the present invention (corresponding to claim 17) is the laminated bandpass filter ~~according to the 15th or 16th invention~~, wherein said first and second strip lines are placed in parallel with each other and said third and fourth strip lines are placed in parallel with each other.

Specification at page 12, line 9:

~~The 18th invention~~ Another aspect of the present invention (corresponding to claim 18) is the laminated bandpass filter ~~according to any one of the 15th to 17th inventions~~, wherein said first to fourth strip lines are connected to said internal grounding electrode via a via hole.

Specification at page 12, line 14:

~~The 19th invention~~ Still another aspect of the present invention (corresponding to claim 19) is the laminated bandpass filter ~~according to any one of the 15th to 18th inventions~~, further comprising:

Specification at page 13, line 5:

~~The 20th invention~~ Yet still another aspect of the present invention (corresponding to claim 20) is the laminated bandpass filter ~~according to any one of the 15th to 19th inventions~~, wherein capacitative coupling of an area where said sixth capacitor electrode and said seventh



capacitor electrode overlap each other in the lamination direction forms a jump capacitance.

Specification at page 13, line 12:

~~The 21st invention~~ Still yet another aspect of the present invention ~~(corresponding to claim 21)~~ is the laminated bandpass filter ~~according to any one of the 1st to the 20th inventions~~, wherein said dielectric sheet is made up of a crystal phase and a glass phase, said crystal phase includes at least one of  $\text{Al}_2\text{O}_3$ ,  $\text{MgO}$ ,  $\text{SiO}_3$  and  $\text{RO}_a$  where R is at least one element selected from La, Ce, Pr, Nd, Sm and Gd and a is a numerical value determined stoichiometrically according to the valence of said R.

Specification at page 13, line 21:

~~The 22nd invention~~ A further aspect of the present invention ~~(corresponding to claim 22)~~ is a laminated bandpass filter, said laminated body incorporating the bandpass filter ~~according to any one of the 1st to 21st inventions~~ and the bandpass filter ~~according to any one of the 1st to 21st inventions~~.

Specification at page 14, line 3:

~~The 23rd invention~~ A still further aspect of the present invention ~~(corresponding to claim 23)~~ is a composite high frequency device, wherein said laminated body incorporates the bandpass filter ~~according to any one of the 1st to the 21st inventions~~ and another high frequency circuit.

Specification at page 14, line 8:

~~The 24th invention~~ A yet further aspect of the present invention

~~(corresponding to claim 24)~~ is a composite high frequency device, wherein electronic parts are mounted on said laminated body incorporating the bandpass filter ~~according to any one of the 1st to 21st inventions.~~

Specification at page 14, line 13:

~~The 25th invention~~ A still yet further aspect of the present invention ~~(corresponding to claim 25)~~ is a high frequency device, characterized by comprising the laminated bandpass filter ~~according to any one of the 1st to 24th inventions.~~

Specification at page 14, line 17:

~~The 26th invention~~ An additional aspect of the present invention ~~(corresponding to claim 26)~~ is a laminated bandpass filter manufacturing method comprising the steps of:

Specification at page 15, line 16:

~~The 27th invention~~ A still additional aspect of the present invention ~~(corresponding to claim 27)~~ is a laminated bandpass filter manufacturing method comprising the steps of:

Specification at page 16, line 20:

~~The 28th invention~~ A yet additional aspect of the present invention ~~(corresponding to claim 28)~~ is a laminated bandpass filter manufacturing method comprising the steps of:

Specification at page 29, line 19:

Furthermore, the dielectric layer 505 has strip lines 520 and 521,

and the dielectric layer 506 has strip lines 522 and 523. The dielectric layer 507 has capacitor electrodes 524 and 525 and the dielectric layer ~~507~~ 508 has an internal grounding electrode 526 and connected to the grounding electrode 510.

Specification at page 34, line 21:

The capacitor electrode 916 is connected to one end ~~914a~~ 915a of the strip line ~~914~~ 915 and the capacitor electrode 912 via a via hole 920 and the capacitor electrode 917 is connected to one end ~~915a~~ 914a of the strip line ~~915~~ 914 and the capacitor electrode 913 via a via hole 921.

IN THE CLAIMS:

4. (Amended) The laminated bandpass filter according to ~~any one of claims 1 to claim 3~~ or 2, wherein said first and second strip lines are electrically connected to said internal grounding electrode via a via hole.

5. (Amended) The laminated bandpass filter according to ~~any one of claims 1 to claim 4~~ or 2, wherein only said first and second strip lines are placed on said dielectric sheet.

9. (Amended) The laminated bandpass filter according to any one of claims 1, ~~to claim 8~~, 2, 6 or 7, further comprising:

a third capacitor electrode connected to said input electrode;

a fourth capacitor electrode connected to said output electrode;

a fifth capacitor electrode capacitatively coupled with said third

capacitor electrode; and

a sixth capacitor electrode capacitatively coupled with said fourth capacitor electrode,

wherein capacitive coupling of an area where said third capacitor electrode and said sixth capacitor electrode overlap each other in the lamination direction forms a jump capacitance.

10. (Amended) The laminated bandpass filter according to any one of claims 1, ~~to claim 9~~, 6 or 7, wherein capacitive coupling of an area where said fourth capacitor electrode and said fifth capacitor electrode overlap each other in the lamination direction forms a jump capacitance.

11. (Twice Amended) The laminated bandpass filter according to any one of claims 1, ~~to claim 8~~, 6 or 7, wherein with respect to said internal grounding electrode, on a layer superior thereto, an electrode pattern of at least one of said first and second capacitor electrodes is laminated, an electrode pattern of at least one of said first and second strip lines is laminated on a layer superior thereto, and an electrode pattern of at least one of the capacitor electrode connected to said input electrode and the capacitor electrode connected to said output electrode is laminated on a layer superior to said layer.

12. (Twice Amended) The laminated bandpass filter according to any one of claims 1, ~~to claim 8~~, 6 or 7, wherein all electrode patterns constituting the capacitor electrode connected to said input electrode, the capacitor electrode connected to said output electrode and an input/output capacitance are provided on a layer superior to the layer constituting said strip

lines.

13. (Twice Amended) The laminated bandpass filter according to claim ~~9-or-10~~, wherein with respect to said internal grounding electrode, on a layer superior thereto, an electrode pattern of at least one of said first and second capacitor electrodes is laminated, an electrode pattern of at least one of said first and second strip lines is laminated on a layer superior thereto, and an electrode pattern of at least one of said third to sixth capacitor electrodes is laminated on a layer superior to said layer.

14. (Twice Amended) The laminated bandpass filter according to claim ~~9-or-10~~, wherein said all of third to sixth capacitor electrodes are provided on a layer superior to the layer constituting said strip lines.

18. (Amended) The laminated bandpass filter according to ~~any one of claims 15 to claim 17~~or 16, wherein said first to fourth strip lines are connected to said internal grounding electrode via a via hole.

19. (Twice Amended) The laminated bandpass filter according to ~~any one of claims 15 to claim 18~~or 16, further comprising:

a fifth capacitor electrode connected to said input electrode;

a sixth capacitor electrode connected to said output electrode;

a seventh capacitor electrode capacitatively coupled with said fifth capacitor electrode; and

an eighth capacitor electrode capacitatively coupled with said sixth capacitor electrode,

wherein capacitive coupling of an area where said fifth capacitor electrode and said eighth capacitor electrode overlap each other in the lamination direction forms a jump capacitance.

20. (Amended) The laminated bandpass filter according to ~~any one of claims 15 to claim 19~~ or 16, wherein capacitive coupling of an area where said sixth capacitor electrode and said seventh capacitor electrode overlap each other in the lamination direction forms a jump capacitance.

Claim 21 has been cancelled.

22. (Twice Amended) A composite high frequency device, wherein said laminated body incorporates the bandpass filter according to any one of claims 1, to claim 20, 6, 7, 15 or 16 and another high frequency circuit.

23. (Twice Amended) A composite high frequency device, wherein electronic parts are mounted on said laminated body incorporating the bandpass filter according to any one of claims 1, to claim 20, 6, 7, 15 or 16.

24. (Twice Amended) The laminated bandpass filter according to any one of claims 1, to claim 23, 6, 7, 15 or 16, wherein said dielectric sheet is made up of a crystal phase and a glass phase, said crystal phase includes at least one of  $\text{Al}_2\text{O}_3$ ,  $\text{MgO}$ ,  $\text{SiO}_3$  and  $\text{RO}_a$  where R is at least one element selected from La, Ce, Pr, Nd, Sm and Gd and a is a numerical value determined stoichiometrically according to the valence of said R.

25. (Amended) A high frequency device, characterized by comprising the laminated bandpass filter according to any one of claims 1, to claim 24, 6, 7, 15 or 16.

## AMENDED CLAIMS UNDER PCT ARTICLE 19

1. A laminated bandpass filter comprising:
  - an input electrode, output electrode and grounding electrode placed on an end face of a laminated body integrating a plurality of laminated dielectric sheets;
  - an internal grounding electrode provided in an internal layer of said laminated body and connected to said grounding electrode;
  - a plurality of capacitor electrodes including at least a first and second capacitor electrodes; and
  - a plurality of strip lines including at least a first and second strip lines,wherein said first and second capacitor electrodes are capacitatively coupled with said internal grounding electrode and electrically connected to one ends of said first and second strip lines, respectively,
  - the other ends of said first and second strip lines are electrically connected to the grounding electrode, and
  - said first and second strip lines are placed on said same dielectric sheet in a certain distance and thereby electromagnetically coupled within the same layer.

2. The laminated bandpass filter according to claim 1, wherein said first and second strip lines have the same length and width.

3. The laminated bandpass filter according to claim 1 or 2, wherein said first and second strip lines are placed in parallel with each other.

4. The laminated bandpass filter according to any one of claim 1 to claim 3, wherein said first and second strip lines are electrically connected to said internal grounding electrode via a via hole.

5. The laminated bandpass filter according to any one of claim 1 to claim 4, wherein only said first and second strip lines are placed on said dielectric sheet.

6. A laminated bandpass filter comprising:

an input electrode, output electrode and grounding electrode placed on an end face of a laminated body integrating a plurality of laminated dielectric sheets;

an internal grounding electrode provided in an internal layer of said laminated body and connected to said grounding electrode;

a plurality of capacitor electrodes including at least a first and second capacitor electrodes; and

a plurality of strip lines including at least a first and second strip lines,



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wherein said first and second capacitor electrodes are capacitatively coupled with said internal grounding electrode and electrically connected to one ends of said first and second strip lines, respectively,

the other ends of said first and second strip lines are electrically connected to the grounding electrode, and

said first strip line is placed on a first dielectric sheet and said second strip line is placed on a second dielectric sheet, and said second dielectric sheet is placed directly below said first dielectric sheet and said first and second strip lines are electromagnetically coupled.

7. The laminated bandpass filter according to claim 6, wherein said first and second strip lines have the same length, width and position within the plane.

8. The laminated bandpass filter according to claim 6 or claim 7, wherein said first and second strip lines are electrically connected to said internal grounding electrode via a via hole.

9. The laminated bandpass filter according to any one of claim 1 to claim 8, further comprising:

a third capacitor electrode connected to said input electrode;

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a fourth capacitor electrode connected to said output electrode;

a fifth capacitor electrode capacitatively coupled with said third capacitor electrode; and

a sixth capacitor electrode capacitatively coupled with said fourth capacitor electrode,

wherein capacitative coupling of an area where said third capacitor electrode and said sixth capacitor electrode overlap each other in the lamination direction forms a jump capacitance.

10. The laminated bandpass filter according to any one of claim 1 to claim 9, wherein capacitative coupling of an area where said fourth capacitor electrode and said fifth capacitor electrode overlap each other in the lamination direction forms a jump capacitance.

11. (Amended) The laminated bandpass filter according to any one of claim 1 to claim 8, wherein with respect to said internal grounding electrode, on a layer superior thereto, an electrode pattern of at least one of said first and second capacitor electrodes is laminated, an electrode pattern of at least one of said first and second strip lines is laminated on a layer superior thereto, and an electrode pattern of at least one of the capacitor electrode connected to said input electrode and the

capacitor electrode connected to said output electrode is laminated on a layer superior to said layer.

12. (Amended) The laminated bandpass filter according to any one of claim 1 to claim 8, wherein all electrode patterns constituting the capacitor electrode connected to said input electrode, the capacitor electrode connected to said output electrode and an input/output capacitance are provided on a layer superior to the layer constituting said strip lines.

13. (Amended) The laminated bandpass filter according to claim 9 or 10, wherein with respect to said internal grounding electrode, on a layer superior thereto, an electrode pattern of at least one of said first and second capacitor electrodes is laminated, an electrode pattern of at least one of said first and second strip lines is laminated on a layer superior thereto, and an electrode pattern of at least one of said third to sixth capacitor electrodes is laminated on a layer superior to said layer.

14. (Amended) The laminated bandpass filter according to claim 9 or 10, wherein said all of third to sixth capacitor electrodes are provided on a layer superior to the layer constituting said strip lines.

15. A laminated bandpass filter comprising:

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an input electrode, output electrode and grounding electrode placed on an end face of a laminated body integrating a plurality of laminated dielectric sheets;

an internal grounding electrode provided in an internal layer of said laminated body and connected to said grounding electrode;

a plurality of capacitor electrodes including at least a first to fourth capacitor electrodes; and

a plurality of strip lines including at least first to fourth strip lines,

wherein said first to fourth capacitor electrodes are capacitatively coupled with said internal grounding electrode and electrically connected to one ends of said first to fourth strip lines, respectively,

the other ends of said first to fourth strip lines are electrically connected to the grounding electrode, and

said first and second strip lines are placed on said first dielectric sheet in a certain distance, said first and second strip lines are electromagnetically coupled within the same layer, said third and fourth strip lines are placed on the second dielectric sheet in a certain distance, said third and fourth strip lines are electromagnetically coupled within the same layer, said second dielectric sheet is placed directly below said

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first dielectric sheet and said first and third strip lines and said second and fourth strip lines are electromagnetically coupled respectively.

16. The laminated bandpass filter according to claim 15, wherein said first to fourth strip lines have the same length and width, said first and third strip lines have the same position within the plane and said second and fourth strip lines have the same position within the plane.

17. The laminated bandpass filter according to claim 15 or claim 16, wherein said first and second strip lines are placed in parallel with each other and said third and fourth strip lines are placed in parallel with each other.

18. The laminated bandpass filter according to any one of claim 15 to claim 17, wherein said first to fourth strip lines are connected to said internal grounding electrode via a via hole.

19. (Amended) The laminated bandpass filter according to any one of claim 15 to claim 18, further comprising:

a fifth capacitor electrode connected to said input electrode;

a sixth capacitor electrode connected to said output electrode;

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a seventh capacitor electrode capacitatively coupled with said fifth capacitor electrode; and

an eighth capacitor electrode capacitatively coupled with said sixth capacitor electrode,

wherein capacitative coupling of an area where said fifth capacitor electrode and said eighth capacitor electrode overlap each other in the lamination direction forms a jump capacitance.

20. The laminated bandpass filter according to any one of claim 15 to claim 19, wherein capacitative coupling of an area where said sixth capacitor electrode and said seventh capacitor electrode overlap each other in the lamination direction forms a jump capacitance.

21. (Amended) A laminated bandpass filter, said laminated body incorporating the bandpass filter according to any one of claim 1 to claim 20 and the bandpass filter according to any one of claim 1 to claim 20.

22. (Amended) A composite high frequency device, wherein said laminated body incorporates the bandpass filter according to any one of claim 1 to claim 20 and another high frequency circuit.

23. (Amended) A composite high frequency device, wherein electronic parts are mounted on said laminated body incorporating the bandpass filter according to any one of claim 1 to claim 20.

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24. (Amended) The laminated bandpass filter according to any one of claim 1 to claim 23, wherein said dielectric sheet is made up of a crystal phase and a glass phase, said crystal phase includes at least one of  $\text{Al}_2\text{O}_3$ ,  $\text{MgO}$ ,  $\text{SiO}_3$  and  $\text{RO}_a$  where R is at least one element selected from La, Ce, Pr, Nd, Sm and Gd and a is a numerical value determined stoichiometrically according to the valence of said R.

25. A high frequency device, characterized by comprising the laminated bandpass filter according to any one of claim 1 to claim 24.

26. A laminated bandpass filter manufacturing method comprising the steps of:

forming an input electrode, output electrode and grounding electrode on an end face of a laminated body integrating a plurality of laminated dielectric sheets;

forming an internal grounding electrode in an internal layer of said laminated body connected to said grounding electrode;

forming a plurality of capacitor electrodes including at least a first and second capacitor electrodes; and

forming a plurality of striplines including at least a first and second strip lines,

wherein said first and second capacitor electrodes are capacitatively coupled with said internal grounding electrode and electrically connected to one ends of said first and second strip lines, respectively,

the other ends of said first and second strip lines are electrically connected to the grounding electrode, and

said first and second strip lines are placed on said same dielectric sheet in a certain distance and thereby electromagnetically coupled within the same layer.

27. A laminated bandpass filter manufacturing method comprising the steps of:

forming an input electrode, output electrode and grounding electrode on an end face of a laminated body integrating a plurality of laminated dielectric sheets;

forming an internal grounding electrode in an internal layer of said laminated body connected to said grounding electrode;

forming a plurality of capacitor electrodes including at least a first and second capacitor electrodes; and

forming a plurality of strip lines including at least a first and second strip lines,

wherein said first and second capacitor electrodes are capacitatively coupled with said internal grounding



electrode and electrically connected to one ends of said first and second strip lines, respectively,

the other ends of said first and second strip lines are electrically connected to the grounding electrode, and

said first strip line is placed on a first dielectric sheet,

said second strip line is placed on a second dielectric sheet, and

said second dielectric sheet is placed directly below said first dielectric sheet and thereby said first and second strip lines are electromagnetically coupled.

28. A laminated bandpass filter manufacturing method comprising the steps of:

forming an input electrode, output electrode and grounding electrode on an end face of a laminated body integrating a plurality of laminated dielectric sheets;

forming an internal grounding electrode in an internal layer of said laminated body connected to said grounding electrode;

forming a plurality of capacitor electrodes including at least a first to fourth capacitor electrodes; and

forming a plurality of strip lines including at least first to fourth strip lines,

wherein said first to fourth capacitor electrodes are capacitatively coupled with said internal grounding electrode and electrically connected to one ends of said first to fourth strip lines, respectively,

the other ends of said first to fourth strip lines are electrically connected to the grounding electrode, and

said first and second strip lines are placed on said first dielectric sheet in a certain distance, said first and second strip lines are electromagnetically coupled within the same layer,

said third and fourth strip lines are placed on said second dielectric sheet in a certain distance, said third and fourth strip lines are electromagnetically coupled within the same layer,

said second dielectric sheet is placed directly below said first dielectric sheet and said first and third strip lines and said second and fourth strip lines are electromagnetically coupled respectively.

World Intellectual Property Organization  
PCT Division  
34 Chemin des Coolombettes  
1211 GENEVA 20  
Switzerland

Date; 22. November. 2001

Article 19  
Amendment  
as filed

Amendment of the claims under Article

Re : International Application No. PCT/JP01/05201  
International Filing Date : 19. June. 2001  
Applicant : Matsushita Electric Industrial Co., Ltd.  
Agent : Matsuda patent attorney

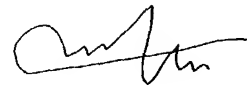
Dear Sir.

The Applicant, who received the International Search Report relating to the above identified International Application transmitted on 19. June. 2001, hereby files amendment under Article 19(1) as in the attached sheets.

Further, the Applicant amends claims 11, 12, 13, 14, 19, 21, 22, 23 and 24 and therefore the Applicant files the amended sheets (pages 33, 34, 35, 36 and 36/1) for replacement.

MATSUDA PATENT OFFICE

very truly yours,



MASAMICHI MATSUDA  
PATENT ATTORNEY

Attachment:

(1) Amendment under Article 19(1)

5 sheets

前記出力電極に接続された第4のコンデンサ電極と、  
 前記第3のコンデンサ電極と容量結合する第5のコンデンサ電極と、  
 前記第4のコンデンサ電極と容量結合する第6のコンデンサ電極とを  
 有し、

前記第3のコンデンサ電極と前記第6のコンデンサ電極の積層方向に  
 重なり合う部分の容量結合により、飛び越し容量を形成することを特徴  
 とした請求項1～8の何れか一つに記載の積層バンドパスフィルタ。

10. 前記第4及び第5のコンデンサ電極の積層方向に重なり合う  
 部分の容量結合により、飛び越し容量を形成することを特徴とした請求  
 項1～9の何れか一つに記載の積層バンドパスフィルタ。

11. (補正後) 前記内部接地電極を基準として、その上層に、前記  
 第1及び第2のコンデンサ電極の内、少なくとも一方の電極パターンが  
 積層されており、更にその上層に少なくとも第1及び第2のストリップ  
 ラインの内、少なくとも一方の電極パターンが積層されており、更にそ  
 の上層に前記入力電極に接続されたコンデンサ電極及び前記出力電極に  
 接続されたコンデンサ電極の内、少なくとも一方の電極パターンが積層  
 されている請求項1～8の何れか一つに記載の積層バンドパスフィルタ。

12. (補正後) 前記ストリップラインを構成する層の上層に、前記  
 入力電極に接続されたコンデンサ電極、及び前記出力電極に接続された  
 コンデンサ電極と入出力容量を構成する全ての電極パターンを備えた請  
 求項1～8の何れか一つに記載の積層バンドパスフィルタ。

13. (補正後) 前記内部接地電極を基準として、その上層に、前記  
 第1及び第2のコンデンサ電極の内、少なくとも一方の電極パターンが  
 積層されており、その上層に、前記第1及び第2のストリップラインの  
 内、少なくとも一方の電極パターンが積層されており、更にその上層に  
 前記第3～第6のコンデンサ電極の内、少なくとも一つの電極パターン

が積層されている請求項 9 または 10 に記載の積層バンドパスフィルタ。

14. (補正後) 前記ストリップラインを構成する層の上層に、前記第 3 ～第 6 のコンデンサ電極全てを備えた請求項 9 または 10 に記載の積層バンドパスフィルタ。

15. 複数の誘電体シートを積層して一体化した積層体の端面に設けられた入力電極、出力電極及び接地電極と、

前記積層体の内層に設けられた、前記接地電極に接続された内部接地電極と、

少なくとも第 1 ～第 4 のコンデンサ電極を含む複数のコンデンサ電極と、

少なくとも第 1 ～第 4 のストリップラインを含む複数のストリップラインとを備えた積層バンドパスフィルタであって、

前記第 1 ～第 4 のコンデンサ電極は、前記内部接地電極と容量結合して、前記第 1 ～第 4 のストリップラインの一端とそれぞれ電氣的に接続されており、

前記第 1 ～第 4 のストリップラインの他端は、接地電極に電氣的に接続されており、

前記第 1 の誘電体シートに前記第 1 及び第 2 のストリップラインを一定間隔離して配置し、同層内において前記第 1 及び第 2 のストリップラインを電磁的に結合させ、第 2 の誘電体シートに前記第 3 及び第 4 のストリップラインを一定間隔離して配置し、同層内において前記第 3 及び第 4 のストリップラインを電磁的に結合させ、且つ、前記第 1 の誘電体シートの直下に前記第 2 の誘電体シートを配置し、前記第 1 及び第 3 のストリップライン、前記第 2 及び第 4 のストリップラインがそれぞれ電磁的に結合されていることを特徴とする積層バンドパスフィルタ。

16. 前記第 1 ～第 4 のストリップラインの長さ、幅が等しく、前

記第 1 及び前記第 3 のストリップラインの平面内における配置位置が等しく、前記第 2 及び第 4 のストリップラインの平面内における配置位置が等しいことを特徴とする請求項 15 記載の積層バンドパスフィルタ。

17. 前記第 1 及び第 2 のストリップラインを平行に配置し、前記第 3 及び第 4 のストリップラインを平行に配置することを特徴とした請求項 15 または 16 に記載の積層バンドパスフィルタ。

18. 前記第 1 ～ 第 4 のストリップラインがビアホールを介して前記内部接地電極に接続されることを特徴とする請求項 15 ～ 17 の何れか一つに記載の積層バンドパスフィルタ。

19. (補正後) 前記入力電極に接続された第 5 のコンデンサ電極と、前記出力電極に接続された第 6 のコンデンサ電極と、前記第 5 のコンデンサ電極と容量結合する第 7 のコンデンサ電極と、前記第 6 のコンデンサ電極と容量結合する第 8 のコンデンサ電極を有し、

前記第 5 のコンデンサ電極と前記第 8 のコンデンサ電極の積層方向に重なり合う部分の容量結合により、飛び越し容量を形成することを特徴とした請求項 15 ～ 18 の何れか一つに記載の積層バンドパスフィルタ。

20. 前記第 6 及び第 7 のコンデンサ電極の積層方向に重なり合う部分の容量結合により、飛び越し容量を形成することを特徴とした請求項 15 ～ 19 の何れか一つに記載の積層バンドパスフィルタ。

21. (補正後) 少なくとも請求項 1 ～ 20 の何れか一つに記載のバンドパスフィルタと、請求項 1 ～ 20 の何れか一つに記載のバンドパスフィルタとを、前記積層体に内蔵することを特徴とする積層バンドパスフィルタ。

22. (補正後) 請求項 1 ～ 20 の何れか一つに記載のバンドパスフィルタと、他の高周波回路とを、前記積層体に内蔵することを特徴とする複合高周波デバイス。

23. (補正後) 請求項1～20の何れか一つに記載のバンドパスフィルタを内蔵した前記積層体上に、電子部品を実装することを特徴とする複合高周波デバイス。

24. (補正後) 前記誘電体シートが結晶相とガラス相とからなり、前記結晶相が $\text{Al}_2\text{O}_3$ 、 $\text{MgO}$ 、 $\text{SiO}_2$ 及び $\text{RO}_a$ のうち少なくとも1つを含有することを特徴とする請求項1～23の何れか一つに記載の積層バンドパスフィルタ。

ただし、RはLa、Ce、Pr、Nd、Sm及びGdから選ばれる少なくとも1つの元素であり、aは前記Rの価数に応じて化学量論的に定まる数値である。

25. 請求項1～24の何れか一つに記載の積層バンドパスフィルタを実装したことを特徴とする高周波無線機器。

26. 複数の誘電体シートを積層して一体化した積層体の端面に入力電極、出力電極及び接地電極を形成し、

前記積層体の内層に前記接地電極に接続された内部接地電極を形成し、  
少なくとも第1及び第2のコンデンサ電極を含む複数のコンデンサ電極を形成し、

少なくとも第1及び第2のストリップラインを含む複数のストリップラインとを形成する積層バンドパスフィルタの製造方法であって、

前記第1及び第2のコンデンサ電極は、前記内部接地電極と容量結合して、前記第1及び第2のストリップラインの一端とそれぞれ電氣的に接続し、

さらに前記第1及び第2のストリップラインの他端は、接地電極に電氣的に接続し、

前記第1及び第2のストリップラインは、同一の誘電体シートに配置し、一定間隔離して並べることにより、同層内において電磁的に結合さ

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せることを特徴とする積層バンドパスフィルタの製造方法。

27. 複数の誘電体シートを積層して一体化した積層体の端面に入